



How can the performance of the Electricity Sub-sector be enhanced?

Overview

Electricity remains critical for Uganda to attain the growth trajectory and socio-economic transformation of her fast growing population. However, the overall rate of access to electricity in Uganda remains low (about 19% overall and about 8% in rural areas), while just over 3.2% of the total population has access to modern cooking fuels. The limited access to and cost of electricity has affected delivery of social services, constrained the development of small-scale industrial and commercial enterprises and disillusioned larger-scale industrial and commercial investment in the country.

The Government of Uganda (GoU) has laid out a target of increasing access to electricity to 80% by 2040 under Vision 2040. The strategic actions listed in the second National Development Plan (NDP II) are to: (i) improve the power generation capacity through commissioning of an additional 3500MW of power generating capacity by 2015;(ii) expand the power grid and improve the electricity transmission and distribution infrastructure through carrying out additional investments in the transmission and distribution networks of the country; and (iii) increasing access and usage of electricity by investing in least cost power generation, promotion of renewable energy and energy efficiency in addition to the associated transmission and distribution infrastructure.

Despite Government's increased funding to the electricity sub-sector, the targets arising out of the above strategic actions in the NDP II have not been met. This is due to a combination several factors that have negatively impacted on the performance of the sector. These factors are discussed in this policy brief and several recommendations put forward.

Introduction

Prior to the reforms, the power sector was a monopoly run by a single government owned utility

Key Issues

- High electricity tariffs, with Uganda having the second highest tariffs in the region.
- High power losses of 17%. The power losses are a combination of technical hitches, power thefts and non-payment.
- Poor financial and commercial efficiency due to inability to finance capital investments.
- Low level of electrification with rural coverage at 8% and 18.1% overall coverage compared to the NDPII target of 25%.

company handling generation, transmission and distribution of electricity. The major aim of the reforms was to improve quality of service, connectivity, and reliability; reduce losses, attract private capital investment into the sector and thus enhance overall sector efficiency.

As part of the reforms the state owned utility company - Uganda Electricity Board (UEB) was unbundled into three successor companies namely: Uganda Electricity Generation Company (UEGCL), Uganda Electricity Transmission Company Ltd (UETCL), and Uganda Electricity Distribution Company Ltd (UEDCL). After creating the three (3) companies, the Electricity Regulatory Authority (ERA) was created to oversee the regulation of the UEB successor companies in order to address the power problems that were faced by the sub-sector. The Rural Electrification Agency (REA) was also set up in 2003 to spearhead the extension of the electricity grid to rural areas.



Current Sub-sector performance

Electricity generation

The formally owned UEB’s generation assets, in particular the power plant assets at Owen Falls Dam that were privatised in 2003, are now operated by Eskom Uganda Limited, under a 20-year concession from UEGCL. Several Independent Power Producers (IPPs), such as Bujagali Energy Limited, and a number of small mini-hydro and solar generation are in operation. The country’s total power generation now stands at 1,177MW compared to 180MW in 2003. When Karuma is completed at the end of 2019, the capacity will increase to 1,777MW which is still below the NDP II target of 2,325MW.

However, worth noting is the costs of the country’s investments in the generation sub-sector are not comparable to those being undertaken e.g in Ethiopia where similar projects are being implemented (Table 1).

Table 1: Costs of generation investments compared

Project	Planned capacity	Total investment cost	Average investment Cost
Bujagali HPP	250 MW	US\$0.862Bn	US\$3.5 M per MW
Karuma HPP	600 MW	US\$ 1.688Bn	US\$2.8 M per MW
Isimba HPP	183 MW	US\$ 0.567Bn	US\$3.0 M per MW
Ayago HPP ¹	840 MW	US\$1.97Bn	US\$2.3M per MW
Gibe III HPP	1870 MW	US\$1.8Bn	US\$0.96M per MW
Grand Renaissance HPP	6450 MW	US\$4.8Bn	US\$0.74M per MW

Source: International Hydropower Association

Because of the high unit investment cost, the completion of Bujagali HPP drove the electricity prices in Uganda to US\$ 0.11/kwh, compared to Kenya’s US\$0.075. The tariff has since been further lowered to US\$0.079 after renegotiation of Bujagali

¹ Planned project, works have not commenced

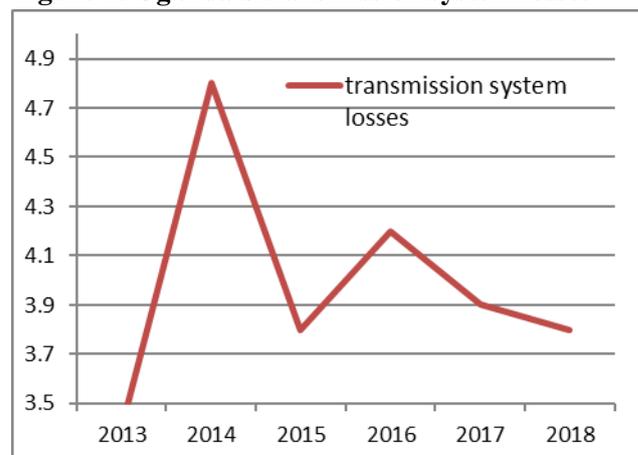
financing. It is projected that Isimba and Karuma Hydro Power Plant will be able to further lower the tariff to US\$0.05, however this is unlikely since the investment cost per MW is rather high compared to similar projects in the region.

Electricity Transmission

The transmission of electricity is under the UETCL the single operator of the transmission system and deals directly with Independent Power Producers (IPPs) by executing Power Purchase Agreements. Most of these agreements are on a take or pay basis which leaves UETCL the burden of paying for deemed energy and Ug shs 30bn was paid in FY 2018/19. The current transmission network stands at 2,569km having grown from 1,178km in 2003.

This has helped lower the power losses on the transmission network but they remain high at 3.8% in 2018 compared to 2.5% which is considered acceptable around the world. The delay in implementation of several key power transmission projects notably Tororo-Lira transmission line, Bujagali-Tororo-Lessos and Karuma-Kawanda transmission projects has affected the further reduction in losses (Figure 1).

Figure 1: Uganda’s transmission system losses



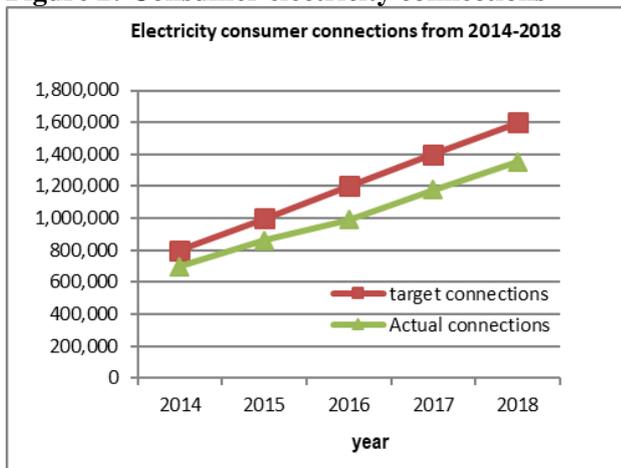
Source: ERA

Electricity Distribution

Several companies have been licensed to undertake distribution of electricity but of these, UMEME has

95% of all electricity consumers. The rest of the consumers are served by smaller companies that are operating in various regions of the country, which has increased access to electricity. However, the connection rates have not met the targets because most of the distribution companies are constrained (figure 2). The current level of electricity access nationwide is 22.5% which is still below the NDPII target of 25%.

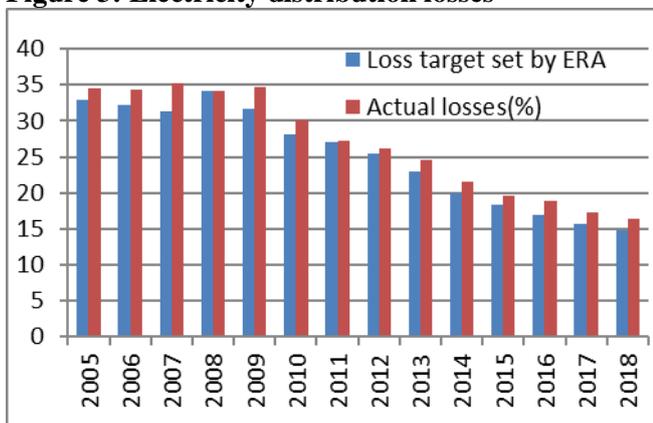
Figure 2: Consumer electricity connections



Source: ERA

The energy losses due to power theft, poor billing and non-collection from Government agencies such as Ministries, Police and the Army have been reducing but remain high (figure 3). The rampant power thefts in Eastern Uganda have made the operations of UMEME very costly in the districts of Mbale, Bududa, Manafwa and Sironko.

Figure 3: Electricity distribution losses

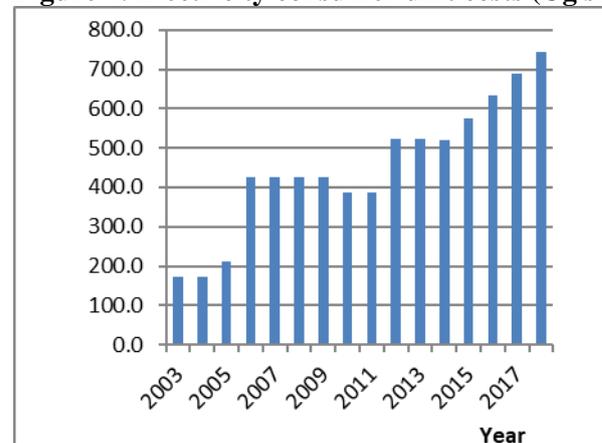


Source: ERA

Challenges affecting performance of the electricity sub-sector

1. High electricity tariffs are coupled with the low transparency of tariffs. The tariffs are not “unbundled” into generation – transmission – distribution - other costs. The tariffs have been progressively rising from year to year (figure 4). The high tariff is partly due to the high level of the electricity losses.

Figure 4: Electricity consumer unit costs (Ug shs)



Source ERA

2. Rigid contractual arrangements linked to Power Purchase Agreements (PPAs). The sector regulator has continued to approve the signing of PPAs which have a take or pay obligation. This imposes a financial burden on UETCL to pay for deemed energy. This is money that would have been utilized under other priority areas in the sub-sector.
3. There are limited financing options for energy projects. Most of the investments (big hydro, rural electrification) are dependent on public finances. This is constraining the sub-sector growth.
4. Weak private sector participation, especially in rural electrification operation due to low connection and low electricity consumption levels in the rural areas. This makes it unattractive for private companies such as UMEME to invest in these areas.



5. High tariffs in the sub-sector have led to depressed demand. The licensing of expensive thermal generation plants and Bujagali HPP to boost generation capacity during the time when the country was faced with a power shortage, continues to keep the tariff high irrespective of the other interventions Government is making to reduce the tariff.

6. Low financial capacity of small distributors/rural cooperatives is limiting their operations especially the ability to grow their consumer base, acquire modern equipment and maintain a good quality network.

7. Poor monitoring and enforcement of licence provisions. The sub-sector regulator and the concession awarding agencies (UEDCL and UEGCL) have not been effective in ensuring UMEME, Eskom and other licenses adhere to the conditions of their licenses such as reduction in the losses, grid network extensions, connection targets, investment in upgrading of the network and other equipment.

Conclusion

The reforms in the sub-sector have gone a long way in improving the level of electricity access from 5% to the current 19%. However, more needs to be done to make the electricity affordable by the population in order to meet the Sustainable Development Goal 7 of universal affordable clean energy. This has to be achieved by reducing waste and implementing projects at the optimum cost so as to reduce tariffs.

Recommendations

1. Generation projects that are considered of strategic importance should be strictly implemented by Government to avoid expensive generation that results in exorbitant power tariffs. This is exemplified by the Bujagali HPP that has not resolved the problem of high power tariffs. The procurement of these public projects should also be undertaken in a transparent and competitive manner to minimize cost. In addition, projects where private investors must participate, should be awarded through a fair, open and competitive process.

2. The planning for the electricity sector should be centralized with the Ministry of Energy and Mineral

Development (MEMD) responsible for the development on a regular basis of a coordinated master plan for generation and transmission to optimize the expansion of the system. This planning should be done closely in consultation with the transmission system operator to ensure the new investments meet the sector's growing needs and optimum operation of the network. This is meant to avoid the current scenario where new generation projects are licensed by the regulator without provision for evacuation of the generated power, leaving the sector with heavy bills for deemed energy from independent power producers (IPPs).

3. To improve the rate of electricity connections the Rural Electrification Agency (REA) should be given more resources so that it can fund the free connections policy. UEDCL's role in rural electrification should be restricted as it is taking up resources that would otherwise be available to REA to extend electricity in the lowly served areas.

4. The electricity regulator should prevail upon the distribution network operators to employ the new available technologies to curb losses and reduce unbilled energy. For example, prepaid energy meters, aerial bundled conductors, automated meter reading and billing system. The high rate of losses is one of the major tariff drivers in the electricity sub-sector.

5. The law regarding the theft of electricity and vandalism of equipment should be made more punitive to deter the two vices.

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